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A STRATEGIC APPROACH TO  
  
ADVANCED TECHNOLOGY TRADE  
  
WITH THE SOVIET UNION

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Class of 1991  
April 1991

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## SECTION I

### BACKGROUND

US technology transfer controls suffer criticism from many corners--industry, academia, foreign governments--even from within the US government itself! This many-faceted problem holds serious, possibly critical, consequences for the security and economic well-being of this nation. Opponents critique the technology controls administration process (a clearly bureaucratic mess), question its effectiveness (the Soviets will acquire technology covertly, if necessary), or question its need (given Gorbachev's Perestroika and democratization policies). These are valid issues, but perhaps not as pertinent as the following questions: Do US technology controls prevent US companies from competing successfully in international markets? And, do these controls prevent the research community from achieving the vigorous exchange of technical information necessary to maintain a competitive position for the US in key technology areas?

US firms routinely sell technology to foreign firms as a condition of market entry; in many cases, these technologies hold potential military applications. These nontariff barriers to trade promote technology growth in the gaining nation and do not violate the General Agreement on Tariffs and Trade (GATT).<sup>1</sup> As a result, foreign firms now use these technologies to produce arms outside the US export control regime and compete directly with US military, industrial and consumer products in legitimate international markets. This does not serve the interests of the US business community or US national security. Technology transfer controls are designed to protect the West's qualitative advantage in military technology and hardware; this objective is as valid now as it was in 1949, when Congress passed the original Export Administration Act. However, Soviet divestiture of

its east Europe satellites and a marked decline in US technology leadership have significantly altered the US technology control environment. Rather than simply modifying the current policies and bureaucracies in response to specific issues, US national security would benefit from a comprehensive technical transfer policy based on strategic planning concepts and sound business principles.

Technology transfer controls comprise one element of the US export policy; many of these controls, although applied broadly, are directed at specific countries or groups of countries--for example, nuclear technology controls are directed against countries based on their Nuclear Proliferation Treaty (NPT) status; other controls target areas such as terrorism, crime, regional stability, weapon delivery systems, chemical weapons, and biological weapons.<sup>2</sup> This paper examines the specific case of controls to prevent the transfer of product information, processes, and know-how to the Soviet Union based on national security interests, but with an important secondary goal--to minimize the impact of these controls on US technological competitiveness. To demonstrate the need for a new, strategic approach to technology controls, the paper begins with a short history, followed by an analysis of major changes in the underpinnings of today's technology export control regime.

### Historical Background

Modern technology controls began during the Second World War and were formalized in their Cold War context with the Export Administration Act of 1949. This Act provided controls to preserve national security, safeguard scarce domestic commodities, and serve as an instrument of foreign policy. Beginning with the Export Administration Act of 1969, changes were made to reflect the growing

reluctance of our allies to maintain a de facto embargo on the Soviet Union and to address US business complaints regarding excessive delays experienced during export license processing. In 1979, the US revitalized the Coordinating Committee for Multilateral Export Controls (CoCom), a largely secretive organization established in 1949 to control the export of strategic technology to Communist countries. During the 1980s the Department of Defense sought and obtained greater authority to review license applications involving high technology exports. By the late 1980s, CoCom members, US industry, and academia began to lobby for a reconciliation between US and CoCom export controls. Today, several actors seek relaxed controls for different reasons: CoCom members resent the impact of the US system on their own international trade; US industry and the Department of Commerce are concerned with the effect of export controls on US competitiveness; academicians believe the strict controls on information will impede further advances in science and technology.<sup>3</sup> These calls for reform reflect significant changes in the political, economic, military, and technology environments of the US and the Soviet Union.

The technology transfer environment today is clearly different from the 1950s, and even the 1980s. The same is true of the automobile industry--the products of the 1990s serve a different environment than the products of the 1950s. But, just as we haven't eliminated the need for automobiles, there is still a valid requirement for export controls on technology. National interests form the foundation for a technology transfer strategy, while today's environment and our projection of its future shape its structure.

## Changes in the Technology Transfer Environment

Superpower Competition. The nature of the 40-year competition with the USSR has dramatically changed: The USSR dissolved the Warsaw Pact's military alliance and is now in the process of removing most of its troops stationed in eastern Europe. Other former East European satellites of the USSR are now experimenting with democracy and market-based economic systems. Germany is now unified and a member of NATO. Within the USSR itself there exists a major political and economic reform movement under the guise of perestroika and glasnost. Major arms control negotiations--Intermediate Nuclear Forces (INF), Conventional Forces in Europe (CFE), and Strategic Arms Reductions Talks (START)--have significantly reduced the Soviet threat to Europe and the risk of superpower confrontation. And as the Gulf Crisis unfolded in 1990, the USSR (albeit for its own objectives) sided with the US against a long-standing Soviet client, Iraq.

Technology Competition. The US now shares leadership in technology areas with other Western nations, particularly Germany and Japan. In the past, US technology dominance provided significant leverage to prevent its allies from pursuing independent technology transfer policies. The US is now increasingly dependent on other countries for high technology products and equipment, particularly in the microelectronics area. Furthermore, the number of university students majoring in engineering, science, and mathematics has fallen dramatically, reducing the US potential to improve its research and development production.

Consumer Product Research. Consumer products are much less dependent on defense research and development; in many areas, the civilian sector employs more sophisticated technology in its products

than the military incorporates in its most advanced weapon systems. A prime example is the explosion in computational power available to the public through the high speed microprocessors in their personal computers. Information processing technology advances too rapidly for the cumbersome military acquisition process to keep pace; as a result, seemingly innocuous transfers of "routine" civilian technology to the Soviet Union pose a potential threat to Western military competitive advantage. Fortunately, the Soviet military system's acquisition process is even less prepared than the West's to capitalize on these opportunities.

Arms Proliferation. The Department of Defense is concerned with the availability of sophisticated weapons to lesser developed countries; transferring advanced technology to any country, ally or foe, could reduce the relative qualitative advantage of US weapon systems in future regional conflicts. Technologies needed to produce weapons of mass destruction, ballistic missiles, and other long range weapon platforms are particularly critical to protect. This expanded focus of technology controls further complicates an already difficult problem.

USSR Technology Marketing. The USSR owns commercially significant technology and has demonstrated its willingness to sell it to the West. A significant example involves the sale of a Soviet nuclear reactor to a US scientific consortium performing research for the Air Force and the Strategic Defense Initiative Organization (SDIO).<sup>4</sup> Clearly, this reactor has both military and civilian applications. While "reverse" technology transfer is not an export control issue itself, it could provide a vehicle for future policy changes. It could also fuel the CoCom resistance to adopt US export restrictions as member policy.



Proprietary Information Protection. The US business community is either unwilling, or unable, to protect proprietary information. Domestically, intellectual rights enjoy substantial protection, but the international community has yet to adopt similar measures. The problem is apparent now because commercial opportunities arising from new technology are more easily exploited overseas. If US business doesn't sell its processing technology or technical know-how, and attempts to manufacture the product domestically, overseas competitors simply steal the basic concept and market the product at a lower cost. There is little incentive to retain proprietary information in this environment. A good example of this phenomenon is the massive market for IBM "clones" in the United States.

US Industrial Competitiveness. Finally, US companies now find themselves unable to compete with foreign-produced products. Federal regulations enacted over 50 years ago to protect the US consumer and labor force impede the ability of US companies to compete in today's global market. Furthermore, the DoD no longer can subsidize the massive research and development efforts of the past--the source of US technology leadership--at the same time other governments are increasing their subsidies to their own advanced technology firms. Given international competition, a domestic monopoly seems implausible --arguably, US antitrust legislation is in need of revision.

Despite the warming of our relations with the Soviet Union, a tension still exists--as a result, the US and its allies must maintain their military and technology lead over the USSR. Clearly the West would like to see continued economic and political reforms in the USSR, but the Soviet's lack of advanced information processing and manufacturing technologies remains a severe impediment. This

situation poses a dilemma--the technology transferred to aid political and economic reforms also improves the Soviet's military technology base. The strategic planning model provides a useful mechanism to deal with these conflicting objectives.

#### Methodology: The Strategic Planning Model

The first step in devising a strategy for US technology transfer is to identify the competing interests driving the current policy and its proposed changes. Since national interests are relatively stable, they provide a firm foundation for a strategic approach to the technology transfer problem. The second step is to project likely future environments based on analysis of the current situation. Elements common to these alternative projections are the core environment; differences in each projection are termed alternative environmental variations. Also listed are possible events which could influence the projections; these are called exogenous contingencies. The third step is to develop the strategy itself based on specific objectives and the projected environment. The central element is the core strategy; it focuses on interests applied to the core environment. From a US perspective, some alternative environmental variations are better than others; an environment-shaping strategy attempts to influence the future environment to favor US interests. Since a variety of factors shape the environment, the US must also develop hedging strategies based on possible contingencies outside the scope of the core and environment-shaping strategies to protect its critical national interests.<sup>5</sup>

## SECTION II

### COMPETING INTERESTS

Although interests remain fairly consistent over time, their priorities shift due to changes in bureaucratic and environmental emphasis. For example, the dramatic changes in East Europe following the fall of the Berlin Wall on November 7, 1989 significantly altered the West's perception of the threat to Europe and shifted emphasis within the US to its domestic interests. This is an example of a priority shift due to an exogenous contingency (opening the Berlin Wall). An example of different bureaucratic emphases can be seen in the different priorities Republicans and Democrats place on free trade and job protection. Clearly, Republican administrations place greater emphasis on free trade while Democratic administrations favor worker protection, although both parties promote these policies in support of the same national interest, economic well being. These examples demonstrate the need to examine all the pertinent sets of competing interests; in this case they are US strategic, USSR strategic, and bureaucratic interests.

#### US Strategic Interests

National Security. For years, the US justified export controls on the basis of national defense and the Communist threat. The significant Western qualitative advantage in military technology provided the US and its allies a measure of security against the superior quantity of Soviet forces and weapons. Technology transfer controls provided the means to maintain this security balance in the West's favor. Although US interest in national security is still strong, the perceived threat (an environmental factor) is now diminished.

Economic Well-being. The US population is generally content to leave national security to the government, but policies affecting economic well-being and international trade often cause great concern. Export controls directly influence international trade; critics believe they disturb the economy. Until the 1970s, US technological and manufacturing preeminence minimized concern over these interests, but with the current excitement over economic and industrial competitiveness, export controls are now often perceived as a structural impediment to progress in this area.

Value Projection. Throughout the 1950s and 1960s, the US used export controls to "punish" the Soviet Union for its communist ideology in the name of national security. The policy was largely ineffective because the Soviet Union had no interest in trade with the West; today, the situation is quite different.<sup>6</sup> Proponents of technical transfer reform often advocate the use of technology to promote continued development of democratic values and the free market system in the Soviet Union. In their view, technology transfer would improve national security because interdependence between the two systems reduces the risk of conflict. As codified in Henry Kissinger's "web of economic interdependence" strategy underpinning "detente" this concept failed miserably; however, perestroika and glasnost now provide new credibility to this idea.

#### USSR Strategic Interests

National Security. The history of the Soviet Union portrays the struggle of a country to fend off invading neighbors, most recently the Germans during the "Great Patriotic War". Based on their experience, only a strong, credible military posture can provide them an element of security--the USSR cannot allow itself to fall far behind its potential enemies in weapon capabilities, and must acquire

weapon production technologies at least marginally competitive with those of the West. The inherent limitations of the Communist economic system force the Soviets to depend on the West for innovation and to maintain elaborate systems for both legal and covert technology acquisition.<sup>7</sup>

Domestic Economy. The Soviet centrally-controlled economy lacks the technological infrastructure to accommodate the growing information requirements of an advancing society. For years, military hardware production displaced consumer needs; the government invested heavily in its war machine and ignored other elements of its deteriorating manufacturing base. The Soviets have no source of consumer innovation to bolster their military research and development--a significant strength of the West's vibrant market economies. As a result, the USSR desperately needs technology to reverse a precipitous decline in its standard of living and to participate in the information-intensive markets of the West. Perestroika alone can't undo the devastating effects of a militarily-dominated command economy.

Soviet System Preservation. Despite the market economy rhetoric, the Soviets are not interested in a capitalistic system--a command economy with incentives is a better description of their objective. Balancing their need for modern technology is a fear of its consequences on the population. Authoritarian regimes regulate information to control the population; even glasnost's limited access contributed to unrest. Furthermore, the Soviets are suspicious of foreign investment. Basically, foreign investment implies foreign ownership, hardly compatible with an economy opposed to private ownership. The government prefers total ownership of technology to

any type of partnership arrangement with Western firms; however, their recent moves to relax private and foreign ownership rules may reflect their current sense of desperation.

### Bureaucratic Interests

Bureaucratic interests generally reflect a narrow perspective often in conflict with strategic national interests. Their influence on strategic policy is often quite significant, and occasionally out of proportion, to their relative importance; therefore, the strategist must take them into account. This discussion considers five of the most significant bureaucracies influencing this problem.

Department of Defense (DoD). The West depends on technological superiority to compete with the Soviet Union's substantially greater production of military hardware. The DoD poses simple alternatives to prevent the development of an adverse military imbalance: Control the transfer of militarily significant technology to the USSR, or increase defense spending. From the DoD's perspective, strict and comprehensive export controls simplify the technology export monitoring process, allow better enforcement of the export control regime, and reduce the potential for unintentional transfer of critical technologies.

Department of Commerce. Technically, the Commerce department is responsible for export control administration; more importantly, it represents the interests of US industry and is committed to the improvement of US economic and industrial competitiveness. Neither the Commerce department nor US industry opposes the concept of export controls for national security reasons provided the administration of these controls allows US business to compete effectively in international markets. One serious impediment to equitable competition is the use of embargoes and other barriers to trade in

response to political situations; these impair the credibility of US industry in the international marketplace. Collectively, US industry and its proponents promote further relaxation of the export controls on dual-use technology and products.

Department of State. From a diplomatic perspective, trade is a useful tool of statecraft. Expanded trade serves two objectives: First, it promotes further reforms in Soviet society to include democratization, market economies, and free trade. Second, a healthy relationship is necessary to credibly employ trade suspension as a political instrument; however, in previous attempts such as the 1980 grain embargo and 1982 gas pipeline sanctions, such actions actually heightened tensions and impeded progress towards the political objective.<sup>8</sup> In fact, extensive use of foreign trade as a political weapon remains a source of fundamental disagreement between governments in West Europe and the US. As an institution, the State Department promotes the elimination of impediments to free trade except where national security is clearly an issue.

Academic and Research Institutions. Academia cringes at the prospect of controls on the flow of research information or further restrictions on foreign access to information within the US. From their perspective, the innovation of the West is the product of an open society; restrictions on the flow of scientific information would reduce Western technology development to the levels experienced in the Soviet Union. Since US industry depends on academia and research institutions for a significant portion of its basic and pre-application research (in part to comply with US anti-trust laws), further restrictions would complicate and possibly reduce the spirited exchange of information so important to their past success. These

institutions also present the following argument: Since the Soviet Union's basic research efforts apparently achieve a level of success comparable to those in the US, further restricting this information would provide questionable benefits to US security interests.

Soviet Military. The Soviet Union is no more a monolith than the US in terms of bureaucratic structures; for example, although its political leadership may compromise ideology to prevent economic disaster, the armed forces will likely oppose programs to develop civilian technology at the expense of weapon modernization or reduced military control over technology acquisition. Although the entire Soviet bureaucracy places great importance on risk reduction, this precept is the cornerstone of Soviet military thinking; hints of compromise among elements of the government responsible for the domestic economy will undoubtedly lead to military-civilian conflicts not unlike the bureaucratic tensions in the US. Unless the Soviet military believes the risk to national security is negligible, they will oppose foreign entanglements in any sector reducing their control over the acquisition of advanced technology for military purposes.

The complexity of the technology transfer issue arises from the wide variety of competing, seemingly unreconcilable interests its many actors hold. The interests of other states inside and outside of CoCom add another layer of complexity--in fact, CoCom members have argued against the current US policy for years because of its negative impact on their own international trade and have generally encouraged further relaxation of the control regime. However, since the US exerts tremendous influence on Western technology transfer policy both unilaterally and through CoCom, individual CoCom members wield little influence in developing the US technology trade strategy; therefore, a separate analysis of their interests is unnecessary.



### SECTION III

#### ENVIRONMENTAL ASSESSMENT

To address the competing national security and industrial competitiveness interests at the heart of the technology transfer issue, the paper projects future environments for the relationship between the US and USSR, as well as the alternative states of US competitiveness. The core environments depict the constants in the strategic model; these characteristics are valid now and are unlikely to change significantly in the future. The alternative environments comprise the elements of each interest area subject to change in the future.

##### Core Environment: US/USSR Relationship

Ideology. Capitalism and the socialism practiced in the Soviet Union are totally incompatible ideologies--no accommodation would allow them to mesh smoothly. The Soviet Union, despite all its recent reforms, has no intention to abandon socialism for capitalism; instead, it hopes to adapt socialism to the times in the hopes of reviving the currently failing system. Market reforms are not incompatible with socialism; in fact, Lenin's New Economic Policy (NEP) employed similar measures during the 1920s to deal with the economic problems of that time. Therefore, while the Soviets welcome Western technology and capital, they reject capitalism, and will oppose policies designed to promote capitalism in the Soviet Union.

Strategic Threat. The Soviet Union possesses the only weapons posing a direct threat to US security--nuclear-armed ICBMs and SLBMs. Conversely, strategic weapons in China and the West pose the greatest threat to the USSR. Despite the progress to reduce these arsenals, the threat will remain. From the Soviet perspective, arms control is

a means to achieve flexibility while constraining its adversaries. From both East and West perspectives, it provides an opportunity to reduce the economic burden of nuclear deterrence.

Correlation of Forces. The Soviet Union is determined to remain a superpower and places great importance on maintaining a favorable "correlation of forces," a relative balance of political, military, economic, social, and technological capabilities with its potential adversaries. The military's declared objective over the years to achieve and maintain parity with the West's military arsenal impaired the country's ability to develop its economic and technological elements of power. Although the USSR may alter its emphasis on military programs as part of its reform movement, it will continue to pursue an improved overall correlation of forces to include technology advancement through legitimate trade. In many cases, technology available for routine civilian applications in the West comprises "advanced" technology for the Soviet military; its military arms development depends significantly on acquiring these technologies to maintain a tolerable correlation of forces with the West.

Defense Spending. Although the Soviet economic system is in shambles largely due to excessive government expenditures on its extensive military machine, defense spending will continue to dominate the Soviet budget. The military will make short-term concessions to improve the correlation of forces in the long term, but the military will certainly oppose drastic cutbacks similar to the periodic budget declines the US military experiences. The Soviet military fears the West's technical prowess; its clients have performed poorly when their Soviet equipment faced Western weapon systems and, although operator

proficiency was often a factor, quality and technological deficiencies were clearly evident. Iraq's recent trouncing once again confirmed their fears.

Arms Sales. Despite the discrediting of its weapons, the USSR will continue to provide arms to lesser developed countries (LDCs) throughout the world, and Western nations are likely to face Soviet-made weapons in future conflicts. The Soviet Union desperately needs arms sales to obtain hard currency for international trade; the marketability of these weapons suffers when their technology is inferior to those of the West. In the future then, the Soviets will continue to export weapons to LDCs, and these weapons will contain technology acquired from the West.

#### Alternative Environments: US/USSR Relationship

Continued Reform. Clearly, the most desirable environment from a US/Western perspective is a continuation of Gorbachev's reforms including perestroika, glasnost, and democratization. A continued reform environment encourages improved relations between the superpowers to include foreign policy coordination and reduced tension over issues of trade, human rights, and technology transfer. The failure of economic reforms poses the greatest threat to this environment; the Soviets need Western assistance to modernize telecommunications, manufacturing equipment, and other elements of the industrial infrastructure supporting their shifts in factory production from military to consumer goods.

Stagnated Reform. If Gorbachev's reforms fail to recover the domestic economy, the overall reform movement will stagnate, and reactionary forces will press for conservative measures, hampering economic progress still further. Overall relations will suffer: The

Communist Party will label Western assistance as imperialistic interference, the military will call for a hardline stance on defense issues, and internal Soviet bureaucratic pressures will complicate US/USSR cooperative efforts on international affairs.

Policy Reversal. A hardliner government takeover to prevent breakup of the union or put a halt to ideological heresy would return US/USSR relations to a situation resembling those of the Cold War period. Initially the USSR would oppose most forms of cooperation with the West; it would certainly view Western overtures of assistance with great suspicion.

USSR Breakup. A complete dissolution of the USSR could lead to civil war with fighting between the republics and the center; internal fighting between opposition groups within the republics is also possible. The threat of such a breakup concerns Western businesses considering joint ventures--would the republics honor contracts negotiated with the central government?

Exogenous Contingencies. Gorbachev's viability and sources of power are key factors in determining the likelihood of these different alternative environments. The overall strategy must consider the possibility of a new leader (or leaders) taking power in the Soviet Union, as well as the potential for significant shifts in Gorbachev's policies if he remains.

#### Core Environment - US Competitiveness

International competition did not concern US industry in the late 1940s and early 1950s when the US initiated export controls targeted against the USSR and its allies. Today, competitiveness is the primary issue opponents of technology transfer controls raise in their campaigns.<sup>9</sup> No one expects the situation to change significantly--

aggressive international market competition is here to stay! Three elements of this issue hold particular significance:

- (1) US firms face fierce competition in markets for advanced technology products and equipment outside the US.
- (2) US firms must compete with imports for a share of the domestic manufactured consumer goods market--quality and price are both factors.
- (3) Foreign firms benefit from host government policies promoting favorable conditions for exports including subsidized research and development, tax benefits, and a permissive environment for joint domestic ventures.

#### Alternative Environments: US Competitiveness

Short term view. The most likely, but not the most desirable, alternative environment exists today. Technology is a short-life commodity--in many cases, profit considerations pressure US firms to sell their intellectual rights, as well as their products, before superior competitors enter the marketplace. Unfortunately, the purchaser is often a foreign firm, provided export controls don't impede the sale. Since domestic constraints complicate the application of technology to production in the US, US firms often enter into joint ventures with foreign firms or use their overseas subsidiaries to develop and manufacture goods destined for the US market. Under these conditions, US government export controls have a significant impact on the ability of US firms to compete in the international technology marketplace. According to a 1986 American Electronics Association survey involving 70 respondents, 66 firms believed US export controls contributed to failed business deals; 68 firms noted existing customers shifting preference to non-US

suppliers; and 65 felt US export controls impaired the consummation of joint ventures with foreign firms.<sup>10</sup> However, since most controls are multilateral in nature (CoCom), export controls were probably not the critical factor in the majority of these situations.

Long-term view. The more desirable alternative is an environment where US manufacturers are again able to produce competitive products for domestic and export sale. If US firms use their technology to produce goods domestically, raw technology exporting is no longer necessary--greater profit is available through sales of goods and equipment. Of course, advanced technology products are also subject to export controls; however, product sales pose a significantly reduced threat to US security interests and provide greater opportunities for trade arrangements beneficial to collective US interests. US government regulations play a major role in achieving this alternative--they can provide the favorable environment for US firms to compete in the global market and encourage long-term investment strategies.

## SECTION IV

### OBJECTIVES AND POLICY RECOMMENDATIONS

The proposed US strategy for technology trade with the Soviet Union consists of three parts: the core, environment-shaping, and hedging strategies. The core strategy outlines policy recommendations to satisfy US interests in the core environment. The environment-shaping strategy outlines recommendations consistent with US and USSR interests; optimally, these policies will influence both US relations with the USSR, and US competitiveness, toward the preferred alternative environmental variations. The hedging strategy provides policy recommendations to reduce risk and preserve US interests if the environment-shaping strategy is not effective. The policy recommendations describe possible means to achieve the objectives stated for each element of the strategy.

#### Core Strategy: Objectives

Regardless of the alternative environmental variation, a US technology transfer strategy has two objectives:

- (1) Maintain the US and Western technology lead over the Soviet Union, particularly in strategic technology areas.

- (2) Prevent erosion of US competitiveness in technology markets.

These objectives are consistent with current US technology transfer policies; however, opportunities exist to improve US economic competitiveness without jeopardizing national security.

#### Policy Recommendations: Core Strategy

Export Controls. The current US export control regime provides an effective means to achieve the core strategy objectives, particularly with the recent steps to expedite the licensing process; however, the security and economic objectives can be better

integrated. Currently, the DoD evaluates Soviet military technology needs and develops a Militarily Critical Technologies List (MCTL).

These technologies include:

- (1) design and manufacturing know-how,
- (2) highly advanced manufacturing, inspection, and test equipment,
- (3) products accompanied by sophisticated operation, application, or maintenance know-how, and
- (4) state-of-the-art equipment revealing information on the design or manufacture of advanced US military systems.<sup>11</sup>

The MCTL becomes the basis for US proposals to CoCom's International Munitions List and International Industrial List. CoCom also maintains a distinct International Atomic Energy List. Similarly, the US separates its controlled items into three lists: the Munitions List (ML), Commodity Control List (CCL), and Nuclear Referral List (NRL).<sup>12</sup> Three significant problems exist with the administration and enforcement of these lists:

- (1) Different US agencies generate and administer these three lists; there is no central agency to advise prospective US exporters.
- (2) Many items found on CoCom's Industrial List are located on the US Munitions List. As a result, many commercially used items are unilaterally controlled by the US as defense articles rather than dual use items.<sup>13</sup>
- (3) Most CoCom countries, due to limited resources, place essentially no trade restrictions on technology exports to noncontrolled countries with the exception of munitions and proliferation-related items.<sup>14</sup>



The first two problems impair US competitiveness; the last one jeopardizes US security. The US and CoCom should resolve the conflicts between their respective munitions lists. A new title such as, "Primary Application: Military List (PAML)," provides a better description of its function. If an item has a predominantly military application it should appear on the Munitions List (or PAML) both in the US and CoCom. Alternatively, predominantly civilian application items belong on the US Commodity Control List, not the Munitions List. Improving this distinction would provide better control of defense items throughout CoCom and also allow US firms to compete in a variety of dual use technologies previously restricted by the International Trafficking in Arms Regulations (ITAR).

Secondly, the Department of State, Department of Energy, Nuclear Regulatory Commission, and Department of Defense should designate the Department of Commerce as lead agency for export controls and empower it to control exports, subject to specific administrative exceptions negotiated among the responsible agencies. Determining a specific bureaucratic relationship is beyond the scope of this paper, but certainly those agencies (perhaps with White House or Congressional encouragement) can arrive at an acceptable arrangement meeting the requirements of the Export Administration Act, Arms Export Control Act, Atomic Energy Act, and other relevant legislation.

Civilian-Military Technology Conversion. There are two ways to maintain the US military technology lead: (1) Hold the USSR back. (2) Aggressively incorporate technology advancements into US military systems. A major concern with civilian technology transfers arises because the technology available in the civilian sector is more advanced than that incorporated in US military systems. Both the US

and USSR are slow to incorporate advanced technologies in their systems; in the case of the US, the problems lie with the complexities of the acquisition system, modification process, and testing programs. Cost, reliability, and maintainability concerns must be addressed, but an improved process to incorporate technology advancements into existing military systems serves the core objectives and also provides potential economic benefits.

#### Environmental Strategy: Objectives

From a US perspective, continued reform in the USSR is an optimal future for US/Soviet relations; long term improvement in US industrial competitiveness is a beneficial domestic outcome. The objectives of the environmental strategy are then:

- (1) Promote continued market and political reforms in the Soviet Union to include democratization, open information systems, and conversion of manufacturing facilities from military to civilian applications.
- (2) Provide favorable conditions for US industry to compete effectively in markets for advanced technology and technology products.

#### Policy Recommendations: Environmental Strategy

Alternative Technologies. The Soviet Union benefits from advanced technology (relative to its own) even if the technology is not state of the art. In those cases where the Soviets attempt to obtain technology assessed as militarily sensitive for an apparently valid civilian application, US (or other Western) engineers should be able to provide an alternative approach to the specific civilian application. In the West, we refuse to settle for anything less than

the best possible; however, in the Soviet Union, the population is accustomed to second best and welcomes any improvement. Interestingly enough, the Western business community looms as the primary obstacle--while the Soviets may be ready to accept second best from the West as a quantum improvement over their own indigenous products and technologies, Western firms prefer to sell their most advanced technology items. The success of this strategy element is contingent on the ability of the Militarily Critical Technologies List (MCTL) to distinguish different levels of sophistication and military applicability among various related technologies; alternatively, the US (and CoCom) could incorporate a sunset provision in the control regime to eliminate technologies from the MCTL when the West has deployed a generational improvement in the technology area.

Technology Exchanges. One particularly vexing dilemma for Western officials occurs when a policy in support of value projection or economic well being conflicts with other national security interests. In the traditional approach to the problem, policymakers prioritize the interests to resolve the conflict. Invariably, national defense tops the list of interests, so the government abandons the proposed policy or develops a less advantageous alternative. For example, the Soviet Union desperately needs information processing technologies to accelerate its market-based economic reforms, but these same technologies also significantly enhance their military capabilities. In cases like this, assuming alternative technologies are not available, trading Western technology for Soviet technology may provide a preferable solution to the policymaker's dilemma.

Brokering such an exchange would be difficult, but the Soviet Union certainly possesses a wealth of defense-related technology to

offer in trade. Achieving a multilateral consensus among the CoCom members may constitute the greatest obstacle to implementing the exchange. Several conditions must exist before attempting to negotiate the trade:

- (1) Transferring the technology to the Soviet Union must serve the interests of the West collectively, not simply a minority of CoCom members.
- (2) Significant demand for the technology must exist in the Soviet Union's civilian sector.
- (3) The Soviet Union must make militarily significant technology available; from a Western security perspective, it must provide an improvement in Western technological capability essentially equivalent to the Soviet Union's gain from the transferred Western technology.

Economic Interdependency. The ideological differences between the two systems jeopardize contractual relationships. The US has embargoed exports bound for the USSR, and Soviet law is not designed to protect Western businesses. Both the Soviet government and US business community therefore face significant obstacles to the establishment of a vibrant trade arrangement. Joint ventures allow the Soviet Union to acquire production technology needed for civilian projects while US firms retain the technical know-how to service and upgrade the equipment. Such an arrangement provides incentives for both sides to bargain in good faith and comply with the contractual terms. US business still faces the problems of government intervention and currency recovery--government policy will solve the first problem while American financial ingenuity will likely solve the latter.

Reduce Exit Barriers to Military Competition. Converting military equipment manufacturing plants to consumer goods production entails some risk from the Soviet perspective--perhaps unacceptable risk from the Soviet military perspective. Their exit barrier is the technological superiority of the West and the fear of dropping further behind militarily if resources are diverted from military to civilian production. The US and other Western nations can reduce this barrier by moderating the deployment of qualitative weaponry improvements to maintain an acceptable balance of forces, and negotiating reductions in all armament categories.

Industrial Competitiveness. Several of the proposed policy options recommend transfer of products rather than processes or know-how. When the US transfers technology to another country, that country becomes a potential competitor in international technology products markets. For example, using technology licensed from the US, Japanese firms captured the US consumer electronics market and drove US manufacturers out of business. US firms often depend on foreign manufacturers to capitalize on US-developed technology; their profits depend on transferring technology. However, if US firms manufactured quality, competitively-priced goods developed from their technology, they could profit more from sales of goods than the technology used to produce them. What can the US government do?

- (1) Continue to press for an intellectual rights protection regime under the General Agreement on Tariffs and Trade (GATT). Competition in the international high technology market makes protection of intellectual property rights essential to US economic competitiveness. Unauthorized copying ("piracy") of computer software, semiconductor chip designs, and industrial

products results in significant losses to US rights-holders, and undermines the incentive for advanced research, technological innovation, and high technology manufacturing in the US.<sup>15</sup>

(2) Remove anti-trust restrictions on joint venture research and development, and allow US firms to combine resources for product development ventures. In today's global economy, US domestic monopolies are highly unlikely.

(3) Provide incentives for domestic high-technology manufacturing facilities. If the demand for advanced technology development in the civilian sector declines, the US military loses a valuable source of advanced technology for its weapon systems.

#### Hedging Strategy: Objective

The policy recommendations provided to meet the environmental strategy may not shape the USSR reform program or US competitiveness environments as desired; the hedging strategy objective is to minimize the adverse effects if a non-preferred environment develops. In this case, programs or policies are necessary to ensure the US does not lose its technological advantage and endanger its core objectives.

#### Policy Recommendations: Hedging Strategy

Strategic Technology Reserve. Under this program, the US integrates and tests technology advances as potential weapon system upgrades, but delays deployment until the Soviets reach a predetermined capability level where deployed US weaponry begins to lose its qualitative advantage. Covert Soviet collectors have greater difficulty acquiring US military technology before it enters production; furthermore, the Soviet military would resist the incorporation of an unproven Western technology in their weapon

systems. If the US decided not to deploy the technology, its effectiveness would remain uncertain--an unacceptable risk from a Soviet perspective. There is a corresponding risk for the US--the Soviet Union could acquire the technology through indigenous research or from other sources--but with aggressive intelligence collection against the Soviet Union, the US could time the deployment of weapon system upgrades to maintain the desired level of technological advantage.

Industry Self-Regulation. Relaxing export controls reduces the government's ability to prevent illegal technology diversions or improper use of legally transferred technology. The US firms brokering these arrangements know more about the transaction than an analyst could possibly glean from an export license application. With greater freedom should come increased responsibility to safeguard US developed technology, particularly those of military significance. Violations of export control laws--through design or negligence--should result in clearly defined sanctions, fines, and/or criminal prosecution.

The three elements of the technology transfer strategy--core, environment-shaping, and hedging--allow the US to maintain an aggressive export control policy but pursue seemingly contradictory policies: to foster reform in the Soviet Union and improve industrial competitiveness in the United States. Section V summarizes the technology trade strategy and analyzes its effectiveness in dealing with the issues identified in Section I.

## SECTION V

### CONCLUSION

A strategic approach to technology transfer benefits the US. The comprehensive strategy outlined in section IV provides a credible response to the environmental changes in the US, Soviet Union, and their relations; satisfies US strategic interests; and addresses the other issues involved in the current debate over technology export controls.

The core element anchors the other elements of the strategy; since national interests remain relatively stable, its primary objective--to maintain the West's technology lead over the Soviet Union--is consistent with the technology export policies in place today. However, the secondary objective, economic competitiveness, cannot be satisfied without new approaches to the problem. Although the current technology transfer regime is basically sound, simple administrative changes would spur improvements in meeting both objectives.

First, the absence of a clearly defined technology transfer focal point is a severe impediment--the Department of Commerce, if placed in this role, could easily bridge the national security and economic competitiveness objectives. Second, disparities between US and CoCom controlled item lists complicate worldwide technology transfer administration and enforcement; they also restrict US firms to a greater extent than their foreign competitors. Finally, greater efficiencies in the transfer of civilian technology to US military applications would further improve US weaponry and permit greater technology trade with the Soviet Union without jeopardizing national defense.



The environment-shaping element of the strategy outlines policy recommendations encompassing the significant environmental changes described in section I. It not only assumes a change in the structure of the competition between the US and the Soviet Union, but provides incentives to encourage further Soviet reforms. It also provides favorable conditions for US firms to compete successfully in technology markets; however, several policy recommendations employ means outside the normal scope of the export control community. Since a major issue surrounding US export controls is their perceived contribution to a decline in US economic competitiveness, incorporating proactive policies to reverse this perceived decline without jeopardizing national security is an important element of the overall strategy.

Looking to US strategic interests, the core and hedging strategy elements protect the survival of the United States, even with a significant reversal of US/Soviet relations. The environment-shaping strategy directly addresses US economic well-being through policies to improve industrial competitiveness, and specifically promotes US values in the Soviet Union through technology transfers targeted to accelerate market reforms and support continued democratization.

The policy recommendations also address the specific US technology transfer issues raised in Section I. First, streamlining some requirements for formal licensing, resolving disparities between CoCom and US controlled item lists, and providing a single focal point for potential US exporters greatly simplifies the administrative process. Second, the recommendations would improve the effectiveness of export controls--a simplified regime is easier to enforce; furthermore, new incentives for companies to protect their proprietary

information tightens private sector controls on technology without additional regulatory requirements. Finally, the strategy responds to the Soviet Union's current state of relations with the US, but proposes a cautious, balanced approach: Provide technology for Soviet commercial needs, but establish a strong hedge against a future reversal in Soviet policy toward the West.

Will the strategy work? Although the objectives of the strategy are straightforward, some of the proposed policy recommendations affect bureaucracies outside the export control arena and require significant changes to long standing legislation. The strategy also tests US resolve to improve its global competitiveness--many of the perceived impediments to competitiveness cited by critics of US export control policies are eliminated. This strategic approach focuses decision-makers on problems, not symptoms; if it leads to coherent policies directed at resolving the seemingly conflicting objectives of national security export controls and technological competitiveness . . . then it achieved its goal.

## ENDNOTES

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